Studies of Cystathionine in Horse-hoof

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We reported in the previous paper (Oiwa et al; Botyu-Kagaku, **13**, 23 (1949)) That BHC, γ-heptachlorocyclohexane (m. p. 85-86°, γ-hepta) and o-octachlorocyclohexane (m. p. 148,5°, o-octa) where formed in photochemical reaction between benzene and chlorine in cabon tetrachloride solution.

Afterwards we studied on the mechanism of the formation of o-octa in this reaction by the following experiments; 2 g of benzene, α-BHC, β-BHC, γ-BHC, δ-BHC, α-heptachlorocyclohexane (m. p. 153-154°, α-hepta), β-heptachlorocyclohexane (m. p. 262°, β-hepta) and γ-hepta, respectively, were photochlorinated for 1 hr. in cabon tetrachloride solution containing 6 g chlorine under the illumination of the groups of line than 3126 A° at 40°. By polarographical and organic chemical observations ((Nakazima et al; Botyu-kagaku **13**, 14 (1949), Nakazima et al; ibid. **11**, 3 (1949)) we found that the reactions of o-octa formation in these conditions are complex as follow:

C_6H_6 —— BHC

α-BHC ⋯⋯ γ-hepta
α-BHC ⋯⋯ o-octa

β-BHC ⋯⋯ α-hepta
β-BHC ⋯⋯ o-octa
β-BHC —— β-p-octachlorocyclohexane (m. p. 262° dec., β-p-octa)

γ-BHC ⋯⋯ γ-hepta

δ-BHC ⋯⋯ α-hepta
δ-BHC ⋯⋯ o-octa
δ-BHC —— β-p-octa

α-hepta ⋯⋯ o-octa
α-hepta —— β-p-octa

β-hepta —— β-p-octa

o-dichlorobenzene ⋯⋯ o-octa

in this scheme the processes of the solid lines were isolated substancially and the dotted lines were observed polarographically. The yield of o-octa from o-dichlorobenzene was much less than that from BHC, and o-dichlorobenzene was not isolated from the above photochlorinated products of benzene. So there is great possibility that as the first step BHC will be formed from benzene by additions and as the next step o-octa will be formed from BHC by substitutions.

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31. Studies of Cystathionine in Horse-hoof.

Hiromu Shimomura.

In my previous paper (This report, 17, 81 (1949)), I reported the presence of S-(β-amino-β-carboxyethyl)-homocyteine (cystathionine) in the waste of hourse-

hoof whether it was treated with alkali or not. In the present paper, I isolated three isomers of cystathionine from the native part of the hoof. They are respectively hexagonal, needleshaped, and amorphus.

The yields of cystathionine from the wall-part of the hoof are 1.82% of hexagonal crystal, 0.57% of needle-shaped crystal, and 2,12% of amorphous from, and from the sole-part, 0.44% of hexagonal crystal, 0.32% of needle-crystal, and 0.92% of amorphous form.

The hexagonal cyrstal is nearly insoluble in water, its melting point being 231-233°, and $[\alpha]_D^{22} = -7 \pm 10^0$. Thee needle-shaped crystal and amorphous form are sparingly soluble, both melting points being 215°, while $[\alpha]_D^{22} = -5 \pm 1^0$ in the amorphous form and -3 ± 1^0 in the reedleshaped crystal.

From the values of the rotatory powers, the hexagonal crystal appears to be a native constituent of the horse-hoof, but the other two forms seem to be partly racemized by heating and ammonia-treating during the process of isolation.

32. Studies on the Alcoholization of Cellulose Materials. (VI)

On the Spent-wash of the Fermentation-Mash of the Saccharified Solution of Wood. (Part I)

Hideo Katagiri, Chuji Tatsumi and *Yasuzo Fujii.*

The spent wash (pH 5,5), the distillery waste liquor of the alcohol solution obtained from the saccharified solution of Mulberry-tree, contained 2.0434 g organic matters, 0.9931 g reducing sugars (as glucose), 0.4700 g pentose and 0.0842 g total nitrogen in its 100 cc.

In order to verify the availability of these constituents to yeast, some experiments were carried out on the spent wash added by Reader's nutrients, with three strains of pentose-assimilation yeast isolated by us and with Torula utilis previously acclimatized to pentose. During 120 hours ordinary culture, 1/3 parts of reducing sugars including more than 2/3 parts of pentose were consumed. It is pointed out that small amount of organic metters other than sugars were assimilated, and any noticeable toxic substance was never detected.

In case of shaking-culture, the amount of remaining sugar and the yield of yeast were measured on 12, 18, 24 and 36 hours incubations. The yield of yeast, especially newly isolated yeast No. 107, attained to a maximum on 24 hours culture, when 41~46%, 30% and 75% yields of yeast were observed for the organic matters, total nitrogen and pentose respectively.

The chemical compositions of the yeast thus obtained (7~9% ash, 43~47% crude protein) were found to be similar to those of the yeast obtained from the spent washes of ordinary wood or pulp waste liquor.